

Claims

1. Method of producing a delivery system for medical and/or cosmetic use comprising a carrier and at least one active ingredient characterized by following steps:
 - (i) preparing a liquid wherein at least one active ingredient is dissolved or dispersed
 - (ii) optionally sterilising the liquid
 - (iii) preparing and optionally sterilizing a dry xerogel or film carrier
 - (iv) applying microdroplets of the liquid according to steps (i) or, if applicable, (ii) to at least one surface area of a dry xerogel or film carrier obtained from step (iii)
 - (v) optionally repeating step (iv) at least one time, and
 - (vi) optionally repeating steps (i) to (v) with a liquid containing another active ingredient at least one time
 - (vii) vacuum-drying or freeze-drying the system obtained by above steps.
2. Method of producing a delivery system for medical and/or cosmetic use comprising a carrier and at least one active ingredient according to claim 1, characterized by following steps:
 - (i) preparing a liquid wherein at least one active ingredient is dissolved or dispersed
 - (ii) optionally sterilising the liquid
 - (iii) preparing and optionally sterilizing a dry xerogel or film carrier
 - (iv) applying microdroplets of the liquid according to steps (i) or, if applicable, (ii) to at least one surface area of a dry xerogel or film carrier obtained from step (iii)
 - (v) optionally repeating step (iv) at least one time, and
 - (vi) optionally repeating steps (i) to (v) with a liquid containing another active ingredient at least one time
 - (vii) vacuum-drying or freeze-drying the system obtained by above steps.
3. Method of producing a delivery system for medical and/or cosmetic use comprising a carrier and at least one active ingredient according to claim 1 or 2 characterized by following steps: (i) preparing a liquid wherein at least one active ingredient is dissolved or dispersed; (ii) sterilising the liquid; (iii) preparing and sterilizing a dry xerogel or film carrier; (iv) applying microdroplets of the liquid according to step (ii) to at least one

surface area of a dry xerogel or film carrier obtained from step (iii); (v) optionally repeating step (iv) at least one time, and; (vi) optionally repeating steps (i) to (v) with a liquid containing another active ingredient at least one time; (vii) vacuum-drying or freeze-drying the system obtained by above steps.

4. Method according to any of claims 1 to 3, characterized in that the dry xerogel carrier is formed from a hydrogel by freeze-drying processes.
5. Method according to any of claims 1 to 3, characterized in that the dry film carrier is formed from a hydrogel by evaporative-drying processes, preferably air-drying, vacuum-drying or convective-drying.
6. Method according to any of claim 1 to 5, characterized in that the dry xerogel or film carrier contains one or more swellable, dissolvable or erodable polymers.
7. Method according to any of claim 1 to 6, characterized in that the gel-forming material of the dry xerogel or film carrier is selected from polysaccharides, like alginates, pectins, carrageenans or xanthan, starch and starch derivatives, gums like tragacanth or xanthan gum, collagen, gelatin, galactomannan and galactomannan derivatives, chitosan and chitosan derivatives, glycoproteins, proteoglycans, glucosaminoglycans, polyvinyl alcohol, polyvinylpyrrolidone, vinylpyrrolidone/vinyl acetate copolymers, high molecular weight polyethylene glycols and/or high molecular weight polypropylene glycols, polyoxyethylene / polyoxypropylene copolymers, polyvinyl alcohol, polyacrylates and/or polymethacrylates, polylactides, polyglycolides and polyaminoacids and/or cellulose derivatives.
8. Method according to claim 7, characterized in that the gel-forming material of the dry xerogel or film carrier is selected from cellulose derivatives, preferably methylcellulose, hydroxypropylcellulose, hydroxyethylcellulose, hydroxypropylmethylcellulose, sodium carboxymethylcellulose, ethylcellulose, cellulose acetate phthalate, hydroxypropylmethylcellulose phthalate, cellulose acetate succinate or ethylcellulose succinate or mixtures thereof.
9. Method according to any of claims 1 to 8, characterized in that the carrier contains one or more additional excipients like sugars, sugar alcohols, surfactants, amino acids, antioxidants, polyethylene glycols.
10. Method according to any of claims 1 to 9, characterized in that the carrier has at least two surfaces separated by edges.

11. Method according to any of claims 1 to 10, characterized in that the carrier has approximately the form of a cylinder, a sheet, a cube or a cuboid.
12. Method according to any of claims 1 to 11, characterized in that the microdroplets are applied to one or more surfaces, preferably one or two surfaces.
13. Method according to any of claims 1 to 12, characterized in that the microdroplets are applied in a way that the carrier essentially does not change its shape.
14. Method according to any of claims 1 to 13, characterized in that the microdroplets have a volume between about 0,05 nl and 10 µl, more preferably between about 0,5 nl and 200 nl, most preferably between about 10 nl and 100 nl.
15. Method according to any of claims 1 to 14, characterized in that the microdroplets in step (iv) of claims 1 to 2 are placed separately or with contact to each other or on top of each other, preferably separately.
16. Method according to any of claims 1 to 14, characterized in that the microdroplets are applied in a way that defined spots containing at least one active ingredient are obtained.
17. Method according to any of claims 1 to 3, characterized in that the microdroplets of step (vi), containing another active ingredient are applied separately or with contact to or on top of the microdroplets of the first round of step (iv) , preferably separately from microdroplets of the first round of step (iv) of any of claims 1 to 3.
18. Method according to any of claims 1 to 3, characterized in that the microdroplets of step (vi), containing another active ingredient are applied to a different surface than the microdroplets applied in the first round of step (iv) any of claims 1 to 3.
19. Method according to any of claims 1 to 18, characterized in that the microdroplets are applied in the middle area of a carrier surface, leaving an active ingredient- free edging around said surface area.
20. Method according to claim 1 to 19, characterized in that the liquid of step (i) in claims 1 to 3 contains one or more excipients selected from sugars, sugar alcohols, surfactants, amino acids, buffers, lyoprotectants or antioxidants.
21. Method according to any of claims 1 to 20, characterized in that at least one active ingredient is a protein, peptide, RNA, DNA or another substance potentially unstable in a formulation.

22. Method according to any of claims 1 to 21, characterized in that at least one active ingredient is a substance, that promotes wound healing, preferably a wound healing factor, enzyme or proteinase inhibitor.
23. Delivery system for medical and/or cosmetic use comprising a carrier and at least one active ingredient, obtainable by a method according to any of the foregoing claims.
24. Method of rehydrating a delivery system according to claim 23 characterized in that the composition is brought into contact with an aqueous solution or water outside the patient to be treated.
25. Rehydrated delivery system obtainable by the method according to claim 24.
26. Rehydrated delivery system according to claim 25, wherein a fast release of at least one active ingredient is observed .
27. Rehydrated delivery system according to claim 25, wherein a slow, controlled release of the active ingredient or ingredients is observed.
28. Composition for cosmetic or medical application on skin or on skin wounds, comprising a delivery system according to claim 23 or a rehydrated delivery system according to claim 24 and an inert support, preferably selected from adhesive strip, adhesive wrap, bandage, gauze bandage, compress system.
29. Use of a delivery system according to claim 23 or a rehydrated delivery system according to claim 24 or a composition according to claim 28 for cosmetic treatment.
30. Use of a delivery system according to claim 23 or a rehydrated delivery system according to claim 24 or a composition according to claim 28 as medicament.
31. Use of a delivery system according to claim 23 for the manufacture of a medicament for treating wounds, skin diseases, ocular diseases and/or diseases of a mucosa.
32. Method according to any of claims 1 to 23 characterized in that the microdroplets are applied on one or more surfaces or surface areas of the carrier by means of printing or spotting, preferably by piezoelectric printers, more preferably by printers, which use a syringe pump and a high-speed micro-solenoid valve.
33. Method according to any of claims 1 to 23 or 32 characterized in that the carrier, on which the microdroplets are applied, is heated preferably to not more than 40°C, more preferably to not more than 30°C after step (iv) any of claims 1 to 3.

34. Method according to any of claims 1 to 23 or 32 to 33 characterized in that the system is dried in vacuum after step (iv) of any of claims 1 to 3 to lower the residual moisture preferably below 5%, more preferably below 2%, especially preferably below 1%.
35. Method according to any of claims 1 to 23 or 32 to 34 characterized in that a sterile liquid according to step (ii) of any of claims 1 to 3 containing at least one active ingredient is applied on a sterile carrier according to step (iii) of any of claims 1 to 3 under aseptic conditions, whereby a sterile delivery system is produced.
36. Method according to any of claims 1 to 23 or 32 to 35 characterized in that the sterile liquid according to step (ii) of any of claims 1 to 3 is produced by sterile filtration under aseptic conditions.
37. Method according to any of claims 1 to 23 or 32 to 36 characterized in that the sterile carrier according to step (iii) of claim 3 is obtained by sterilization of the hydrogel by hot vapour or radiation and drying.
38. Delivery system for medical and/or cosmetic use comprising a dry xerogel or film carrier and a pattern of dried microdroplets, containing one or more active ingredients.
39. Delivery system according to claim 38, wherein the pattern is regular.